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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,861	11/12/2003	Yoshitaka Hamada	035576/271444	6729

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EXAMINER

VIJAYAKUMAR, KALLAMBELLA M

ART UNIT

PAPER NUMBER

1751

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/706,861	Applicant(s) HAMADA ET AL.	
	Examiner Kallambella Vijayakumar	Art Unit 1751	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/29/2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-12 and 14-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-12 and 14-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

- A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/29/2007 has been entered.
- The amendment filed 01/29/2007 has been entered.
- Claims 1 and 11 were amended. Claims 3 and 13 were cancelled. Claims 1-2, 4-12 and 14-16 as amended are currently pending with the application.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim-11 recites the limitation of A semiconductor device comprising internal porous film which is which is formable by a composition for forming porous film, comprising and it is not clear whether the internal porous film contains the following composition or the silica film is derived from the said composition.

It is suggested to add the phrase "said film" comprising in Line -2 of the claim to overcome this rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1-2 and 4-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chikuni et al (US 5,755,867).

The use of phrase "for forming porous film" in the claims has not been treated with patentability. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to

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the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Chikuni et al teach a coat-forming coating composition comprising, (a). 0-60 mol% siloxane with the formula $R^1_2SiX_2$ <dimethyldimethoxysilane, a silane of silane of Formula-1, $m=2$ >, (b). 10-100 mol% silane with the formula R^1SiX_3 (< n-decyltrimethoxysilane, a silane of the formula-2> and (c). of a silane with the general formula <tetramethoxysilane, a tetraalkoxysilane, Formula-1, $m=0$ >, and (d). surfactants (Abstract, Cl-5, Ln-Cl-7, Ln 63; Particularly, Cl-6, Ln 3-12, 64-67, Cl-7, Ln 19-21, 55-57; Cl-9, Ln 52-54).

The prior art fails to teach the (Formula-2/Formula-1) wt% ratios of the silanes per the claim-1.

However, the prior art teaches the molar ratio of the components, and when computed as wt% ratios, the low end of the prior art ratios would overlap with the instant claimed component ratios, and in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

With regard to claim-2, the prior art composition is similar to that by the applicants, and similar compositions are expected to possess similar properties.

With regard to claim-4, the prior art molar ratio of the components, when computed as wt% would overlap with the instant claimed component ratios.

With regard to claim-5, the prior art teaches the use of cationic resins having sulfonate or carboxylate at the surfaces (Cl-8, Ln 52-64).

With regard to method steps in claims 6-8, the prior art teaches coating the composition over a substrate forming a film by air drying the composition followed by curing at 250C, and the removal of the surfactant per claim-7 would be obvious.

With regard to the films per claims 8-9, the prior art components, its processing conditions and the utility to form a film are similar to that claimed by the instant claims, and the presence of pores per claim-8 or an insulator film will be a prima facie obvious in the prior art teachings.

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2. Claims 11-12 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Egami et al (JP 2002/030249).

The examiner notes the product by process limitation in the claims, and "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. The instant claim is drawn to a semiconductor device containing a product by process formed internal porous film.

Egami et al teach the semiconductor board containing a dielectric film of silica formed by coating a composition comprising: (A).(a1). **At least one silicon compound** selected from the group consisting of alkoxysilanes of the general formula (i) $X_nSi(OR)_{4-n}$; (a2). Silane halides of the general formula (ii) $X_nSiX'_{4-n}$, wherein $X=H, F, 1-8C \text{ Alkyl}$; $R=H, 1-8C \text{ Alkyl}$; and $X'=halogen$; and (B). A quaternary ammonium organic template (Surfactant) (Abstract; Claim-5, Para 0070), and (C). a polysiloxane comprising hydrozylates of the general formula-1. The component-A is chosen from one or more silanes from a small group that includes trialkoxysilanes such as **octyl trimethoxysilane** and **octyl triethoxysilane** (Formula-2 in the instant claim 11), and methyl trimethoxysilane and dimethyl diethoxysilane (Formula-1 in the instant claim 11, $m=1, 2 \text{ or } 3$) (Para 0015). The component-C is chosen from silanes of the formula $X_nSi(OR)_{4-n}$, similar to that of formula-1 and includes components such as tetraetoxysilane ($n=0$) that will meet the limitation of tetraalkoxysilanes in the film forming composition <Formula-1> (Para 0025). The catalysts included toluenesulfonic acid and metal soaps (Para 0034). The prior art further teaches coating a semiconductor board or a silicon substrate in a semiconductor device with in between wiring layers of multilevel connection and heat treating between 50-300°C and baking at 350-450°C (Para 0044, 0047-0051).

Applicant's dielectric interlayer insulating layer of mesoporous silica film is formed by the calcination of a coating obtained from a cocktail of components, and the components by themselves are not an essential component of the porous dielectric film. The prior art device containing a dielectric silica film with a dielectric constant of ≤ 2.5 is similar to that claimed by the applicants in instant claims 11, 14 and 16 <Abstract>, and When the reference teaches a product that appears to be the same as, or an obvious variant of, the product set forth in a product-by-process claim although produced by a different process,

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the claim is not patentable. See *In re Marosi*, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) And *In re Thorpe*, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP §2113.

With regard to claims 12 and 15, the prior art components and the method of making the film/device are similar to that by the applicants, and the examiner asserts that the art device will be similar to that claimed by the applicants.

Response to Arguments

Applicant's arguments 1/29/2007 have been fully considered and they overcome the rejections in the previous office action mailed 09/28/2006. With regard to the arguments that Egami does not teach the a porous film formed from a mixture per the applicant's film forming composition, the instant claim-11 is drawn to a device containing a porous film, wherein Egami's film on the semiconductor surface is a low dielectric porous silica film that is similar to that claimed by the applicants. Applicant's fail to patentably distinguish their dielectric film/device over Egami's film/device.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8.30-6.00 Mon-Thu, 8.30-5.00 Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on 571-272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KMV
April 10, 2007.

A handwritten signature in black ink, appearing to be 'KMV', followed by a long horizontal line extending to the right.

Patent Examiner